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Patentanmeldung Nr. | Patent application No. | Demande de brevet n°

03257429.5

Der Präsident des Europäischen Patentamts;
Im Auftrag

For the President of the European Patent Office

Le Président de l'Office européen des brevets
p.o.

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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.
If no title is shown please refer to the description.
Si aucun titre n'est indiqué se referer à la description.)

Method for dispensing ice cream

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Method for dispensing ice cream

Technical field of the invention

This invention relates to a method for dispensing ice crea products. The invention particularly relates to a method fo dispensing soft ice cream.

Background

It has been proposed to dispense ice cream from large containers i individual portions by, for example, hand operation using scoops. I has also been proposed to dispense ice cream from machines as b soft serve machines in which the product is mixed, and frozen, or b dispensing machines in which pre-packaged ice cream is delivere from an ice cream container.

Conventional soft ice is dispensed from a semi-continuous, pressurised scraped surface heat exchanger (SSHE) at temperatures o -4 to -9°C. The rheology of ice cream and the shear provided by th SSHE are such that a pressure of a few atmospheres is sufficient t dispense the ice cream at an acceptable rate. Unfortunately, SSHE are large and expensive, require power, training to operate, do not deliver consistent product quality if used over a period of time are difficult to dismantle & clean for the operator. Each SSHE ca also only offer one type of product (e.g. flavour/ice cream/sorbe etc) at a time - separate barrels are required for differen products.

All these known systems are limited by one or more factors such a expensive machinery, slow rate of dispensing, narrow range o product, deterioration of bulk product not used, consistency o portion control, limited flavour selection etc.

Other, more recent dispensing systems use 'cartridges' of ice cream that must be kept at frozen temperatures (often higher than regular deep freeze temperatures of -18 to -22°C) locally separate to the dispensing system. Here the ice cream is not under pressure and therefore the volume in the cartridge is at most the volume of product dispensed, therefore systems take up a bigger footprint. Such dispensing systems are for example described in WO91/01090.

There is therefore a need for a portable business system that supplies multi-portion freshly-dispensed where no power is available locally in a compact, easy to use, hygienic system. The compressed format of the system means the capacity to deliver higher volumes of product for the same stored volume compared to other pre-frozen, aerated products.

Tests and definitions.

Average molecular weight

For the purposes of this patent, the average molecular weight for a mixture of freezing point depressants (fdps) is defined by the number average molecular weight $\langle M \rangle_n$ (equation1). Where w_i is the mass of species i, M_i is the molar mass of species i and N_i is the number of moles of species i of molar mass M_i.

$$\langle M \rangle_n = \frac{\sum w_i}{\sum (w_i / M_i)} = \frac{\sum N_i M_i}{\sum N_i}$$

Freezing point depressants

Freezing point depressants (fpds) as defined in this invention consist in:

- monosaccharides and disaccharides
- Oligosaccharides containing from 3 to ten monosaccharide unit: joined in glycosidic linkage.
- Corn syrups with a dextrose equivalent (DE) of greater than 2(preferably > 40 and more preferably > 60. Corn syrups are complex multi-component sugar mixtures and the dextrose equivalent is a common industrial means of classification. Since they are complex mixtures their number average molecular weight $\langle M \rangle_n$ can be calculated from the equation below. (Journal of Food Engineering, 33 (1997) 221-226)

$$DE = \frac{18016}{\langle M \rangle_n}$$

- Erythritol, arabitol, glycerol, xylitol, sorbitol, mannitol, lactitol and malitol.

Definition of overrun.

Overrun is defined by the following equation

$$OR = \frac{volume\_of\_ice\_cream - volume\_of\_premix\_at\_ambient\_temp}{volume\_of\_premix\_at\_ambient\_temp} \times 100$$

It is measured at atmospheric pressure.

Brief description of the invention

It is the object of the invention to provide a method of dispensing an ice cream product comprising filling a container with an ice cream product, transporting the container from the site of filling to a site at which the ica cream product is to be dispensed, locating the container in a dispensing apparatus, and discharging ice cream product in the container through an outlet of the container, characterised in that the container has at least two compartments (A) and (B), said

compartments being gas-tightly separated from each other by an at least partially movable wall, compartment (A) containing a propellant and compartment (B) containing the ice cream product, compartment (B) being provided with a valve.

By using pre-energised containers, it is possible to apply the method according to the invention in locations where no electrical power is available to dispense the manufacture and dispense ice cream.

Preferably, the filling of the container takes place by introducing the propellant into compartment (A), up to where a pressure of at between 1 barg and 10 barg is reached, then the frozen aerated product is introduced into compartment (B) until a pressure of between 5 barg and 12 barg, preferably above 8 barg, is reached.

Preferably also, the ice cream product contains freezing point depressants in an amount of between 20% and 40% w/w, preferably above 25%, and between 0% and 15% fat, preferably between 2% and12%, the freezing point depressants having a number average molecular weight $\langle M \rangle_n$ following the following condition:

$$\langle M \rangle_n =< -8\ FAT +330$$

wherein FAT is the fat level in percent by weight of the product.

More preferably, the freezing point depressants are made at least a level of 98% (w/w) of mono, di and oligosaccharides.

More preferably also, the dispensing apparatus is equipped with thermal insulation means which surrounds each ice cream container and which maintains product temperature below -15°C for up to 8 hours. It allows for locating the dispensing apparatus in places wherein no electrical power is available to maintain the temperature

of the ice cream product. In an alternative preferred embodiment, the dispensing apparatus is equipped with an insulated casing for example made of insulating foam, or comprising insulating foam panels and the ice cream containers are partially covered by a generally cylindrical casing made of eutectic plates.

Preferably, the dispensing apparatus is designed to releasably hold one or more containers vertically inverted (i.e. with the valve at the bottom). More preferably, the dispensing apparatus is equipped with a storage cabinet adapted to contain additional filled containers.

Detailed description of the invention

The present invention will be further described with reference to the drawings wherein;

Figure 1 is a schematic view of a dispensing unit for operating the process of the invention.

Figure 2 is a schematic partial view of the upper part of a dispensing unit for operating the process of the invention, together with an ice cream container about to be introduces into the dispensing unit.

Figure 3 is a schematic cross section of an ice cream container used in the process of the invention.

Figure 4 is a schematic cross section of another ice cream container used in the process of the invention.

As can be seen on figures 1 and 2, a dispensing unit 10 comprises an upper part 11 adapted to vertically hold individual ice cream containers 20 in wells 12, these wells can be thermally insulated.

This upper part 11 is supported by a frame 13 which is adapted to be fitted on existing tables or countertops. These insulated wells 12 can be in the form of a generally cylindrical envelope preferably containing a eutectic solution. At the bottom of the upper part 11 is located, under each insulated well 12, actuating means 13 adapted to open and shut the valve 22 of the ice cream container 20 container in said well 12.

As can be seen on Figure 3, each ice cream container 20 comprises an outer body 21 of generally cylindrical shape, equipped with a dispensing valve 22 at one end. The outer body 21 is divided in two compartments A and B said compartments being gas-tightly separated from each other by an at least partially movable wall 24, compartment (A) containing a gas under pressure (propellant) and compartment (B) containing the ice cream product, compartment (B) being provided with a valve 22. As can be seen in Figure 3, the movable wall 24 is in the form of a piston sliding against the inside wall of the cylindrical body 21, in another embodiment disclosed in Figure 4, the movable wall 24 can be in the form of a bag 25 attached to the valve 22.

The gas in compartment (A) can be air, it is typically at a pressure of between 5 barg and 12 barg at a temperature of -18 C.

A container 20 can present on its outer body 21, a thermal insulation which can be in the form of eutectic pads forming a generally cylindrical envelope. Each container contains enough ice cream to typically dispense around 10 individual doses.

In operation, ice cream containers 20, filled with different flavoured ice creams, are inserted in their respective wells 12 in the dispensing apparatus 10. On request by a customer, or by the customer himself, the actuating means 13 corresponding to the desired ice cream are operated, the valve 22 is opened and, owing to

the pressure in compartment A of the container, the ice cream contains in compartment be flows out of the container through valve 22 into e.g. a cup or a cone. When the desired dose has been delivered, valve 22 is shut.

CLAIMS

1. A method of dispensing an ice cream product comprising filling a container with an ice cream product, transporting the container from the site of filling to a site at which the ice cream product is to be dispensed, locating the container in a dispensing apparatus, and discharging ice cream product in the container through an outlet of the container, characterised in that the container has at least two compartments (A) and (B), said compartments being gastighlty separated from each other by an at least partially movable wall, compartment (A) containing a propellant and compartment (B) containing the ice cream product, compartment (B) being provided with a valve.

2. A method according to claim 1 characterised in that the filling of the container takes place by introducing the propellant into compartment (A), up to where a pressure of at between 1 barg and 10 barg is reached, then the frozen aerated product is introduced into compartment (B) until a pressure of between 5 barg and 12 barg, preferably above 8 barg, is reached.

3. A method according to claim 1 wherein wherein the ice cream product contains freezing point depressants in an amount of between 20% and 40% w/w, preferably above 25%, and between 0% and 15% fat, preferably between 2% and12%, the freezing point depressants having a number average molecular weight $\langle M \rangle_n$ following the following condition:

$$\langle M \rangle_n =< -8\ FAT + 330$$

Wherein FAT is the fat level in percent by weight of the product.

4. Method to claim 3 wherein the freezing point depressants are made at least a level of 98% (w/w) of mono, di and oligosaccharides .

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Abstract

Ice cream is dispensed from an apparatus comprising holding means for an ice cream container under pressure. Actuating means open and close on request a valve of the ice cream container, thus delivering individual portions of ice cream.

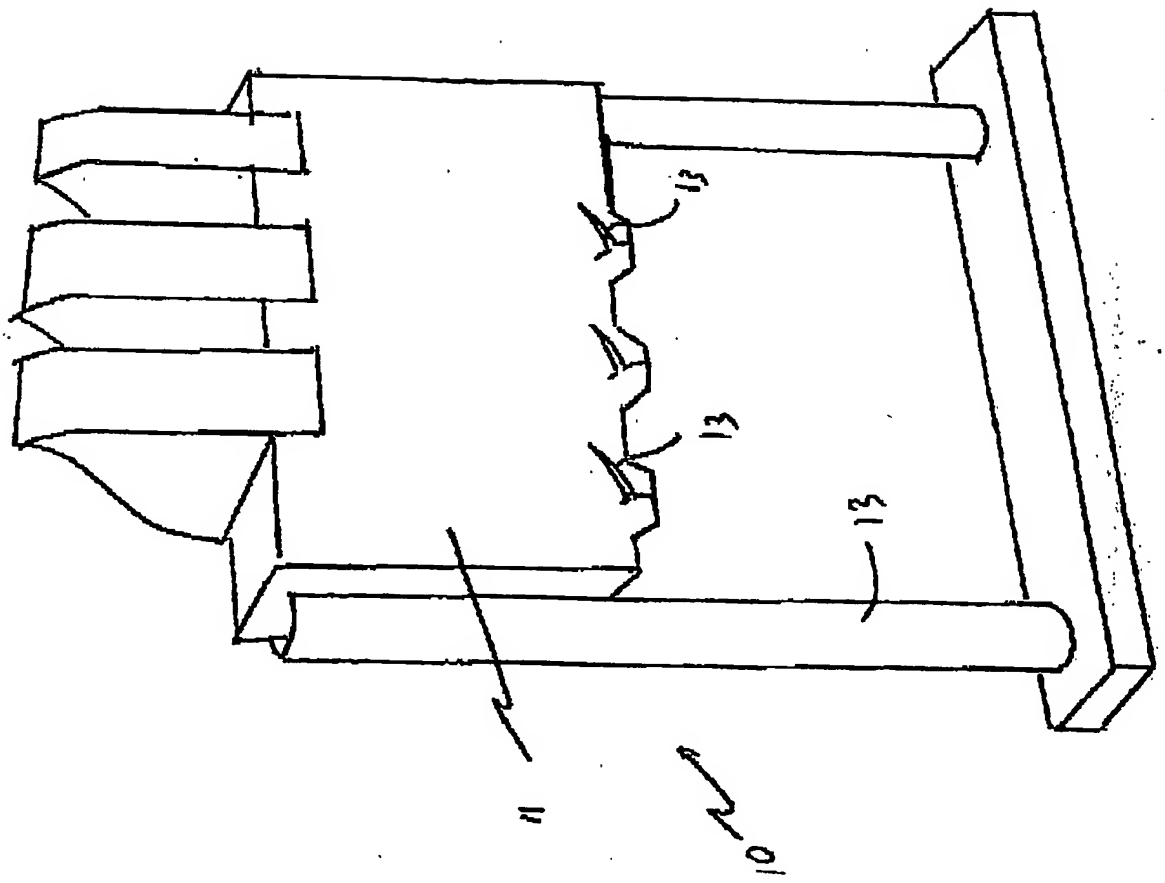
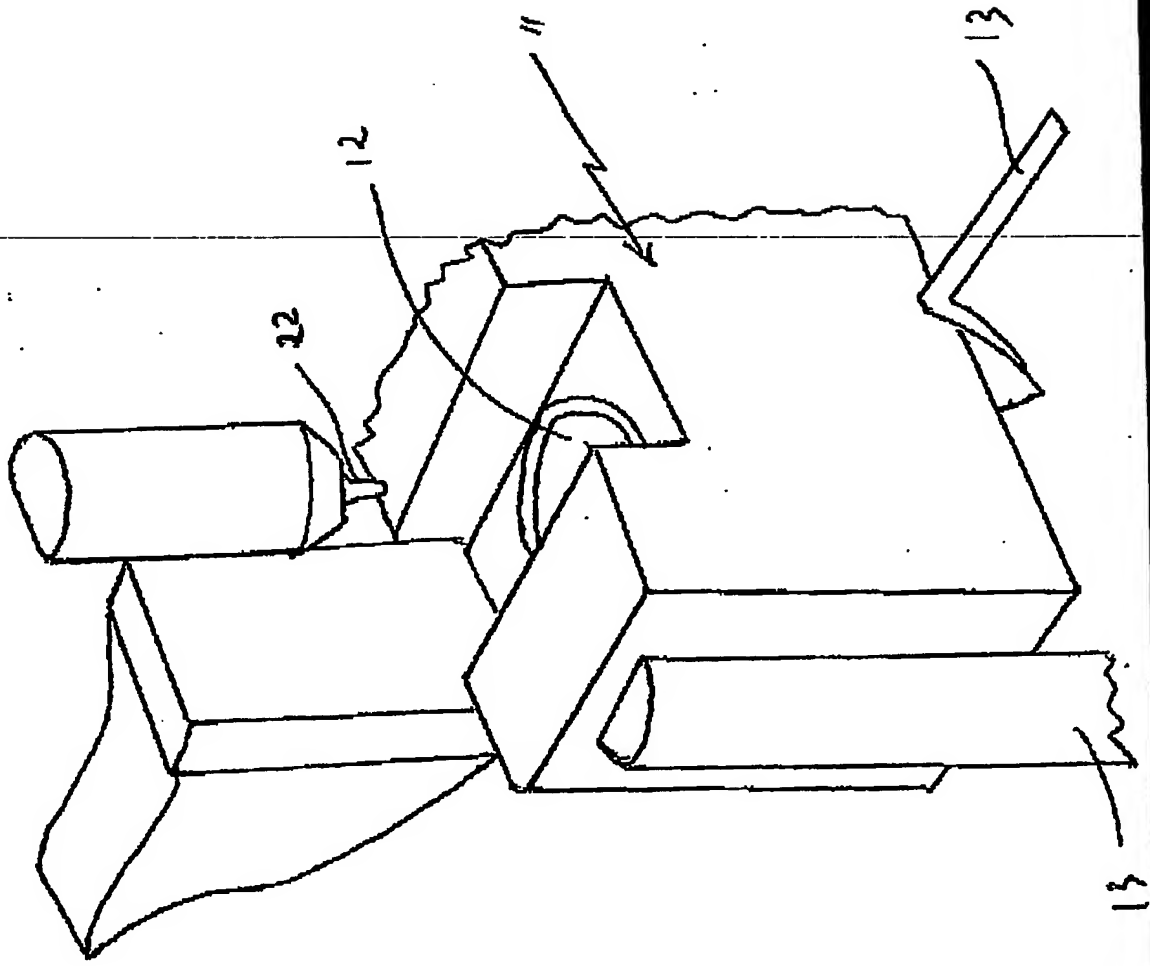


Figure 1

Figure 2



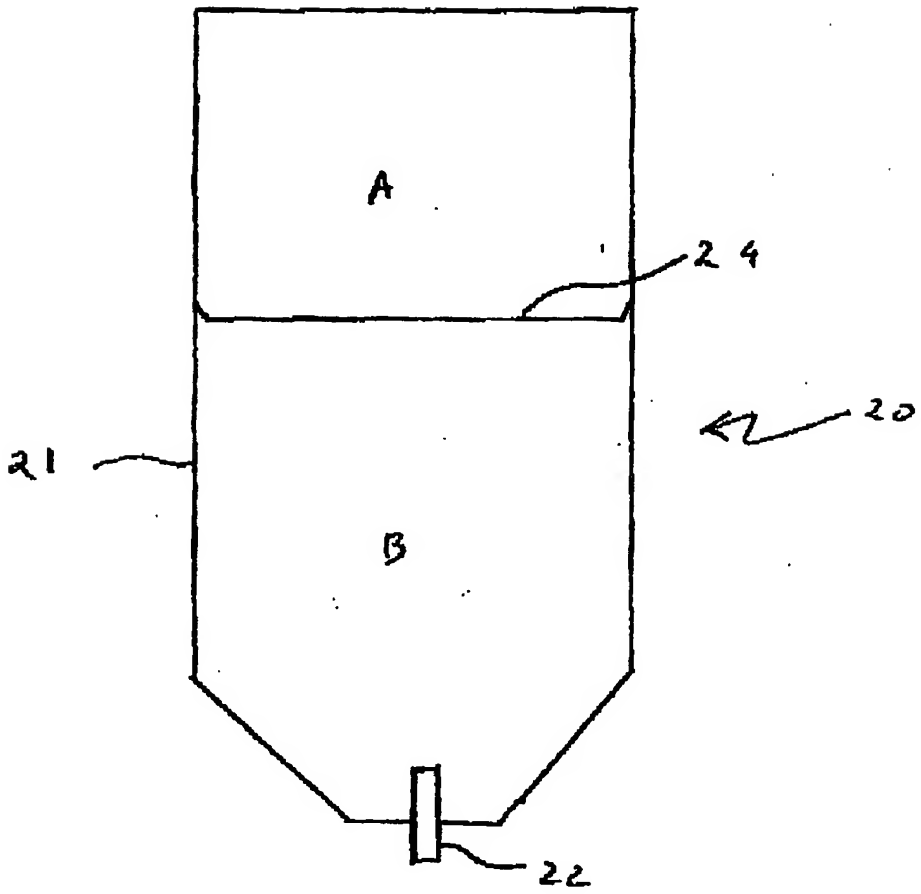


Figure 3

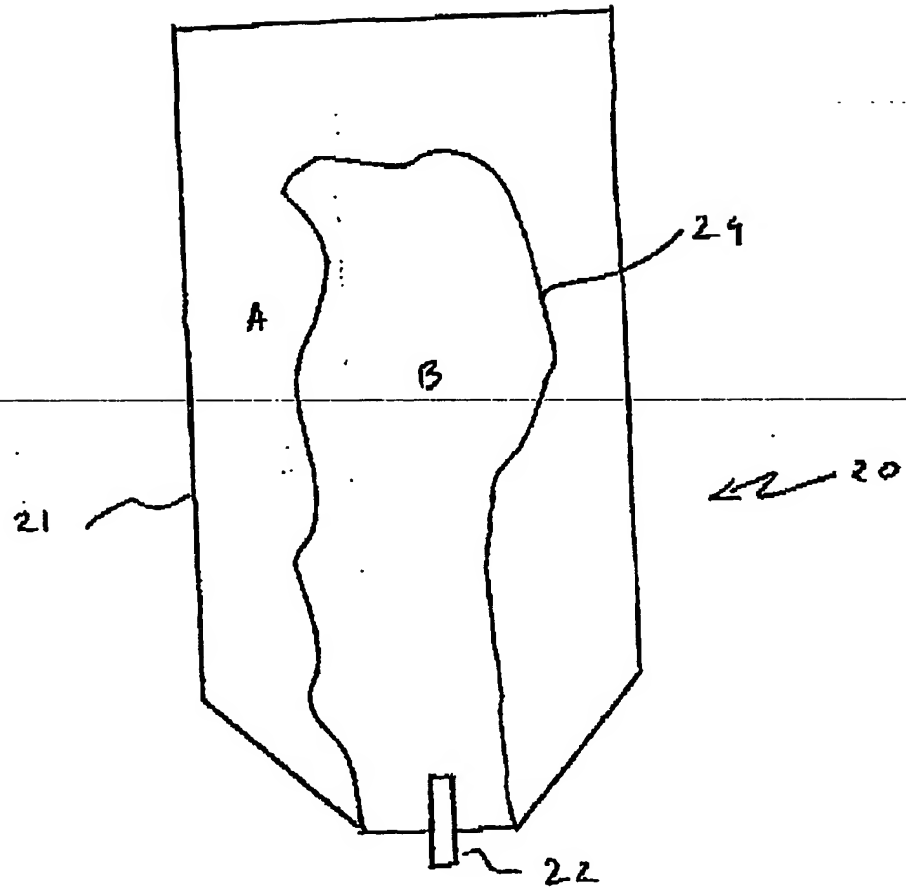


Figure 4